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[Abstract:] *Among the factors that give rise to corruption, it is suggested that three groups be distinguished: fundamental factors rooted in the imperfection of economic institutions and economic policy, organizational factors ("weakness of the government"), and societal factors that depend on the prehistory and are connected with the mass culture and norms of bureaucratic behavior. A model in which corruption equilibrium is supported by nonoptimum tax policy or by slow technical progress is compared with a "societal" model, which has two Nash equilibria of the level of corruption. Recommendations for combating corruption stemming from analysis of the models are discussed.*

Prior to the broad-based reforms, many economists, both in Russia and abroad, believed that dismantling the system of directive control of the economy and adopting the principles of "market" legislation would lead to rapid formation of market institutions. These expectations were not justified. Today we know that, along with the disappearance of lines and the saturation of the consumer market, the direct results of the shock method of implementing reforms without proper preparation are a drop in production, nonpayments, and hidden unemployment, and that criminal economic structures spring up faster than

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the mechanisms of competition and blocking their development.

Corruption serves as the foundation for criminal structures in contemporary society. This article is devoted to a study of corruption as an economic, and partly as a social, phenomenon. It does not touch upon other, possibly no less important, aspects, in particular, the moral aspect. Two questions are central for us: why is corruption, in spite of the universal condemnation of it, an element of the economy's long-term steady state? and why is an intensification of corruption observed in transition economies?

There is no doubt about the importance of this subject for Russia now. According to polls conducted by the international agency Transparency International, Russia is in third place out of fifty-two countries in the level of corruption [1]. By some estimates, the total amount of bribes paid by small businessmen is equivalent to 3 percent of gross domestic product GDP] [2], and this figure does not include corruption in privatization processes. The loss from corruption is apparently much greater.

The first economic models of corruption appeared about twenty-five years ago, and, since that time, a school has formed in economic theory that tries to explain the causes and mechanisms of corruption and to suggest ways of curing the disease. Interest in this subject has become especially strong in recent years in connection with investigations of reforms in East European and developing countries (see, in particular, [3–10]). A number of articles (see [11–13]) have been devoted to the analysis of the situation in Russia. We should note that the subject of corruption is part of the more general theory of rent-seeking (see, for example, the survey [14]). In recent years, studies have begun to appear on the statistical analysis of corruption problems, although so far they have only covered developed capitalist economies [15, 16].

In order to understand how and to what extent we should combat corruption, we need to recognize the causes and consequences of it. In the next section of the article, an attempt is made to summarize the points of view expressed in the literature on these problems. Among the factors that give rise to corruption, it is suggested that we distinguish the fundamental ones rooted in the imperfection of economic institutions and economic policy, organizational factors ("weakness of the government"), and societal ones that depend on prehistory and are connected with mass culture, particularly with the norms of bureaucratic behavior.

In the context of the subject under consideration, one of the most important elements of economic policy is taxes. The influence of the tax system's imperfection on corruption is studied in the second section and in the Appendix. The third section contains the simplest version of a "societal" model. It demonstrates a phenomenon that is typical of this approach, which we call the "corruption trap." Depending on which factors a theory is based, we get dif-

ferent answers to the questions formulated above. The recommendations drawn from various models and some directions for further research are discussed in the final part of the article.

1. Causes and consequences of corruption

The answer to the question "why is corruption harmful?" is not as obvious as it seems at first glance. Along with a long list of negative consequences, a number of authors (see the references in [4, 7, 12]) also point out some positive ones. One important problem is whether it makes sense to try to root out corruption entirely, or is there some "optimum" level of it? Those who reject such a statement of the problem for moral reasons should keep in mind that the struggle against corruption requires funds that could be spent for other purposes. The thesis about the need to root out corruption rests on four main arguments.

1. Corruption entails an inefficient distribution of resources, preventing implementation of government programs and economical spending of budgetary funds, and increasing the transaction costs of business activity. There is a certain analogy between bribes and taxes in their effect on economic agents' choices and on prices. However, corruption activity is connected with the risk of discovery and this causes additional costs. To illustrate this point, a story is told in [7] about a manager from Mozambique who preferred to buy expensive unique equipment instead of quite adequate cheap, standard equipment. This gave him the opportunity to propose an inflated price so that he could get part of it back as a bribe. Not wishing to subject himself to the risk associated with paying a bribe, a businessman is sometimes forced to choose solutions that are less efficient (in a system free of corruption). This circumstance has a particular effect on the flow of foreign investments.

Finally, corruption has a different effect from taxation on various types of business activity, being especially harmful to innovation. For it is precisely innovation that needs intensive government support: licenses, patents, easy credit. Thus, corruption hinders technical progress [5].

2. Corruption leads to an unfair distribution of incomes, enriching a person who takes bribes, and in a number of cases his clients as well, at the expense of the rest of the members of society.

3. A corrupt system (like a totalitarian ideology) implies a significant difference between stated and real values and therefore forms a "dual consciousness." As a result, information flows and power relationships are distorted, and people are hired not for their business qualities, but for their ability to fit into the system of corruption.

4. Corruption is the foundation of criminal structures.

Before we look at the arguments in favor of an "optimum level of corrup-

tion," we need to dwell for a moment on the factors that give rise to corruption. From the long list of factors mentioned in the literature, we can distinguish three groups of them:

A. Imperfection of economic institutions and economic policy, and imperfection of the system of political decision making;

B. Weakness of the government (the lack of a clear legislative base and too frequent changes in economic laws, weakness of the enforcement system, which allows punishment to be avoided, and relatively low payment for government employees' labor);

C. The prevailing norms of bureaucratic behavior; and mass culture, which forms an indulgent attitude toward corruption.

Factors of type A we will call fundamental; type B, organizational; and factors of type C, societal. The first group is connected with the institutional (economic and political) structure of society; the second one, mainly with the organization of law enforcement; and the third, with the historically established system of norms and expectations. Of course, the division is arbitrary; there are "borderline" factors that are difficult to classify with certainty as one type or another.

The arguments in favor of an "optimum level of corruption" appeal to fundamental factors. Due to the imperfection of economic institutions or economic policy, the mechanism of corruption may benefit the majority or even all members of society. This explains its persistence in time. In this case, increasing the punishments for corruption turns out to be economically inefficient. A familiar example of such a situation is a system with inflexible prices and a planned distribution of resources that is adjusted in the implementation stage for bribes. If the bribes are spread around so that they are formed on a competitive (rather than a priority) basis, then the corruption mechanism is Pareto-improving [3].

It is believed that competitive economies are less subject to corruption than planned ones. However, experience shows that even competition does not provide immunity to corruption. The model proposed below enables us to clarify the reasons why corruption is persistent in economies of the market type.

2. Model of corruption equilibrium

The model includes a fixed number of firms and a "generalized" bureaucrat. Each firm has an assigned amount of working capital (in monetary form) at its disposal and is characterized by a production function that depends on two arguments: the amount of investments and the amount of public goods produced in the system. A bureaucrat collects tax on net output at a fixed rate (not depending on output). The amount of tax collected must be automatically transformed into public goods, promoting the growth of production. However, the bureaucrat is subject to corruption and ready to take bribes to make part of the collected government income available to firms as individual subsidies (for example, for supporting the social sphere) or in the form of tax exemptions. Corruption is assumed to be of a massive nature, so that the "price of one ruble of subsidy" is formed in the system, balancing the firms' demand for subsidies with the supply. The amount of supply is established by the bureaucrat, who compares his gain from bribes with the severity of the possible punishment.

A less simplified model would also have to distinguish the legislators who set the "rules of the game" and the government officials who distribute funds within the scope of the adopted budget. In the proposed construction, the bureaucrat is the person who combines both roles.[1]

Equilibrium exists in the described model. In a state of equilibrium, each firm distributes the funds available to it in the optimum way between two directions of investment: in production and in paying for subsidies. The bureaucrat makes the best decision for himself about what part of the tax collection to turn over to the firms as subsidies in return for bribes, and the rest goes to production of public goods.

The described equilibrium with corruption (C-equilibrium) is compared with equilibrium free of corruption, which occurs in the case when the bureaucrat is absolutely honest and sends all of the funds that he collects to production of public goods. The main question consists in revealing the conditions in which the transition from C-equilibrium to corruption-free equilibrium is Pareto-improving for the firms. In this case, we can hope that society will welcome anti-corruption measures. Otherwise, we can talk about the presence of fundamental factors supporting corruption equilibrium.

The investigation showed (see the basic theorem in the Appendix) that fulfillment of the following two conditions a fortiori guarantees that all of the firms will try to get rid of corruption:

(a) the tax burden must not be "too high";

(b) production must be "efficient enough."

In this context, an excessive tax burden means that the firms do not receive sufficient benefit from the amount of tax collected, so that it is more profitable to pay bribes for direct subsidies, in spite of the fact that this decreases the amount of public goods produced. Condition (a) is fulfilled a fortiori if the tax rate is optimally selected.

The condition of efficient production in the proven theorem is analogous to the one derived in [10] and is formulated in terms of cost functions (inverse production functions) as follows: for each firm, the elasticity of marginal costs must not exceed one. If, for some firm, a 1 percent increment in net output requires an increase in marginal costs by more than 1 percent, then it may prove to be more profitable for it to pay bribes for subsidies. Purely quantita-

tive growth leads to exhaustion of nonreproducible resources, and, as a consequence, to a rise in the elasticity of marginal costs. Therefore maintenance of condition (b) requires fairly rapid technical progress.

These conditions are close to necessary. If either one of them is not fulfilled, then the elimination of corruption may be disadvantageous for some or even all producers [17].

If condition (a) is not fulfilled, then increasing the punishment for corruption will be welcomed by society only up to a certain point: a low level of corruption sometimes proves to be economically more profitable than the complete elimination of it. Needless to say, this conclusion may not be true if we take into account the social and moral harm from corruption.

Somewhat generalizing the first of the conditions given above, we can suppose that the more extensive and less effective the government's redistribution activity is, the higher the level of corruption will be. During the reform period, the scale of redistribution activity (including privatization) grew considerably, against the background of a decline in the efficiency of production. This contributed to a rise in corruption.

It was noted above that corruption hinders technical progress. The results cited show that this correlation is two-sided: a low rate of technical progress creates prerequisites for corruption. It is obvious what danger lurks here for transition economies.

3. The corruption trap

An approach to corruption analysis that deals with societal factors, rather than fundamental ones, is especially popular in the latest literature and has been developed by many authors (see, in particular, [4, 5, 8, 9]). We will give a model below[2] that is exceptionally simple and in our view, well illustrates the basic idea of this approach: the presence of more than one (in this case, two) equilibria, the realization of which depends on the prehistory and the prevailing system of expectations. Each of the equilibria corresponds to a certain norm of bureaucratic behavior.

We will consider N identical bureaucrats serving the same kind of clients. Each bureaucrat selects the optimum portion of clients x_n from whom he intends to demand a bribe. The amount of the bribe B is fixed. Without coercing the clients to pay a bribe, the bureaucrat receives an income S equal to his salary. Otherwise, he receives $S + B$, with the probability P that he may get nothing if it is discovered that he has taken a bribe. The probability that it will not be discovered that he has taken a bribe during the period under consideration depends on the average "intensity of corruption" prevailing in the system $x = (\Sigma x_k)/N$. The higher it is, the greater P will be. If corruption is considered

normal, then for a specific bureaucrat the probability of being punished is very slight (see, for example, [9, p. 223]). On the other hand, this probability is high if extorting and paying bribes "is not done." For our purposes, it is sufficient to assume that the function P is continuous and satisfies the inequality

$$P(1) > S/(S + B) > P(1/N).$$

In the corresponding noncooperative game, bureaucrat n seeks the optimum strategy (probability of demanding a bribe) x_n by solving the following problem:

$$\max x_n P((x_n + \Sigma_{k \neq n} x_k)/N)(S + B) + (1 - x_n)S,$$

$$0 \leq x_n \leq 1,$$

where x_k is considered fixed with $k \neq n$. It is directly verified that there are two Nash equilibria in this game. One of them corresponds to the complete absence of corruption ($x_n = 0$ for all n); and the other, to one-hundred-percent bribery ($x_n = 1$ for all n). To make sure that there is no other equilibrium, we will look at the "critical intensity of corruption" x^*, which is determined as the solution of the equation $P(x^*) = S/S + B)$. If the norm of bureaucratic behavior prevailing in the system corresponds to an average intensity of corruption x less than x^*, then it is easy to see that each bureaucrat will be better off if he is perfectly honest, so that $x = 0$. If the average intensity of corruption is greater than or equal to x^*, then it is profitable for everyone to take bribes from any client, and therefore the normal intensity x should be equal to 1. The system's prehistory determines in which of these two equilibria it will be.

In this model, when a bribe is discovered, the official who has taken the bribe is punished by being deprived of his salary. If a fine $Z \geq 0$ is introduced, then the bureaucrat's target function will take the form

$$x_n P((x_n + \Sigma_{k \neq n} x_k)/N)(S + B) + (1 - x_n)S - x_n(1 - P((x_n +$$

$$+ \Sigma_{k \neq n} x_k)/N))Z = x_n P((x_n + \Sigma_{k \neq n} x_k)/N)(S + B + Z) +$$

$$+ (1 - x_n)(S + Z) - Z.$$

We will consider what happens when the fine is increased. As long as $P(1) > (S + Z)/(S + B + Z) = P(x^*)$, the situation is qualitatively unchanged. As before, there are exactly two equilibria, and if corruption is considered the norm, then increasing the punishment has no effect on the bureaucrats' behavior. The system is in the "corruption trap." However, the critical intensity x^* rises with an increase in the fine, and the corruption equilibrium's "field of attraction" diminishes. If, in the face of universal corruption, there is still some probability greater than zero that a bribe will be discovered (i.e., $P(1) < 1$), then for a large enough fine Z the inequality $P(1) < (S + Z)/(S + B + Z)$ is

fulfilled, and the corruption equilibrium disappears. "Honest fulfillment of one's obligations" becomes the bureaucrat's sole permanent strategy.

It is worthwhile to note that in order to move to the equilibrium without corruption in this model it is sufficient to introduce a large fine for just a short time. It proves to be unprofitable to take bribes even after the fine is decreased to zero! Thus, a hysteresis effect takes place here, which also shows up in a number of other models of corruption [4, 5].

In reality, the equilibrium is constantly being disrupted, for example, as a result of a change in factors influencing the type of function P or the value of S and B. Therefore, a more realistic model has to take into account the process of the players adjusting their strategies, and, here, a significant role is played by the relationship fields of attraction of the two equilibria. This relationship is determined by the critical intensity, or, in other words, by the quantity $(S + Z)/(S + B + Z)$.

Within the framework of the rather simplified model described here, we can give the following explanation of the sharp rise in corruption in transition economies. During the reform period, the differentiation of incomes increases considerably, so that the ratio of a bureaucrat's salary S and the size of a bribe B acceptable for a significant group of users of government services decreases. At the same time, the punishments for taking bribes are not increased, so that the critical intensity of corruption x^* drops. Consequently, the field of attraction of the equilibrium without corruption diminishes, and, on the other hand, the field of attraction of the corruption equilibrium expands. This increases the probability that the system will find itself in the corruption trap as a result of fluctuations.

Speaking of societal factors, we cannot fail to mention the question of the predisposition to corruption that some societies supposedly have. What I have observed is that, in Russia, corruption is perceived partly as an element of the new capitalist relations. This is fostered by a blurring of the legal boundaries between commercial and noncommercial activity. Western countries, where capitalism developed gradually, had time to build up a cultural immunity to its diseases. There is no such immunity in societies that have undergone an abrupt change to a market economy. Destruction of traditional values creates a predisposition to corruption, which becomes firmly established when society falls into the corruption trap.

4. Final remarks

The two models considered above lead to different explanations of the corruption phenomenon, and, accordingly, to different recommendations for combating it. The model in the preceding section deals with societal and organi-

zational factors. Analysis of it shows the advisability of increasing bureaucrats' salaries, and, most important, the need for a sharp, even if temporary, increase in punishments for corruption (see also [4, 7]), in order to get out of the corruption trap. The theory of corruption equilibrium set forth in section 2 and the Appendix emphasizes the fundamental corruption factors.[3] Increasing the punishments and decreasing the level of corruption will not necessarily lead to increased prosperity, if the economic policy (tax policy, in particular) is misguided and production stagnates. In the reforming of economies with unsettled economic mechanisms, fundamental corruption factors should play a particularly important role.

Corruption is a disease accompanying any broad-based transformations, and therefore the programs for such transformations should include anti-corruption measures. The problem of working out anti-corruption mechanisms aimed at decreasing "black rent" deserves special attention. They include competitive mechanisms for distributing resources, orders, and licenses (competitions, bidding, expert reviews) and competitive mechanisms of bureaucratic service that provide the opportunity to choose the service agent. In a number of cases, it is useful to introduce payment for services depending on priorities.[4]

Wherever possible, service should be made anonymous—there should be no direct contact between the applicant and the bureaucrat who makes the decision. It is not out of the question that in situations when contact is unavoidable randomization may help (random assignment of a client to a particular bureaucrat). Development and assessment of the efficiency of anti-corruption mechanisms, along with evaluation of the losses from corruption, seem to be tasks of paramount importance.

Appendix

Formulation of the model of c-equilibrium and the basic theorem

The proposed model of corruption equilibrium includes n firms and a bureaucrat who is subject to corruption. A firm i is characterized by an initial reserve M_i of working capital in monetary form and a production function $F_i(m_i, g)$ that depends on the amount of investment in production m_i and on the level of public goods g. Along with investments in production, the firm uses its funds to obtain subsidies in the amount z_i in return for bribes. The term "subsidy" is used in the broad sense; it may be a partial exemption from taxes or a subsidy to support the social sphere. The "price of one ruble of subsidies" q is supposed to be the same for all firms. The quantities m_i and z_i are determined by the firm i as the solution of the following problem:

$$\max (1 - \sigma)F_i(m_i, g) + z_i \text{ with respect to } (m_i, z_i), \quad (1)$$

$$qz_i + m_i = M_i, \quad (2)$$

$$m_i \geq 0, z_i \geq 0, \quad (3)$$

where σ is the assigned tax rate.

The amount of tax collected Z is at the bureaucrat's disposal and is intended for creating public goods g. But the bureaucrat is subject to corruption, and a portion γ of the government's income is distributed among firms as subsidies in return for bribes. It is assumed that an increase in γ is associated with a high risk of punishment, therefore, the bureaucrat is forced to compare the utility of the aggregate amount of bribes m_b with the loss (proportional to γ) from possible discovery of the fact that he has taken bribes. Accordingly, his utility function $U(m_b, \gamma)$ increases with the first argument and decreases with the second. The chosen value of γ is the solution of the problem

$$\max U(m_b, \gamma) \text{ with respect to } \gamma, \quad (4)$$

$$m_b = q\gamma Z, 0 \leq \gamma \leq 1, \quad (5)$$

where government expenditures Z and the "price" of one ruble of subsidies q are parameters;

Definition 1. The set $(m_i, z_i, i \in I, g, \gamma, z, q)$ is called the C-equilibrium, if (m_i, z_i) is the solution of (1)-(3), γ is the solution of (4) and (5), and the following equalities are fulfilled:

balance of government income and expenditures

$$Z = \sigma \Sigma F_i(m_i, g); \quad (6)$$

balance of supply and demand for subsidies

$$\Sigma z_i = \gamma Z; \quad (7)$$

balance of production of public goods

$$g = (1 - \gamma)Z. \quad (8)$$

A modification of this concept is C-equilibrium with a capital market (CCM-equilibrium). It differs in the presence of a credit market between firms, which makes it possible to redistribute the funds M_i that the firms have. In this case, the model of the bureaucrat is unchanged, while the model of a firm is modified in the following way:

$$\max (1 - \sigma)F_i(m_i, g) + z_i + ph_i \text{ with respect to } (m_i, z_i, h_i), \quad (1a)$$

$$qz_i + m_i + h_i = M_i, \quad (2a)$$

$$m_i \geq 0, z_i \geq 0, \quad (3a)$$

where h_i is the credit that firm i grants to other firms (or borrows from other firms, if h_i is negative); and $p - 1$ is the interest rate. To the conditions of equilibrium (6)–(8), one more is added: balance in the capital market $\Sigma h_i = 0$.

Definition 2. The set of variables $(m_i, i \in I, g, p)$ is called equilibrium without corruption if, for solutions m_i of the problem

$$\max (1 - \sigma)F_i(m_i, g) + p(M_i - m_i) \text{ with respect to } m_i, \quad (9)$$

the following conditions are fulfilled:
balance in the capital market

$$\Sigma m_i = \Sigma M_i, \quad (10)$$

and balance of production of public goods

$$g = \sigma \Sigma F_i(m_i, g). \quad (11)$$

If the monetary resources M_i are optimally distributed among the firms from the very beginning, then there is no exchange in the credit market, and CCM-equilibrium coincides with C-equilibrium. It is easy to see that equilibrium without corruption is the limiting case of CCM-equilibrium corresponding to an absolutely honest bureaucrat ($\gamma = 0$).

Investigation of the described models rests on the following assumptions.

A1. F_i increase when $m_i > 0$ and $g > 0$, and are twice differentiable; $F_i(0, 0) = 0$; they are strictly concave with respect to m_i; and $F'_i(0, g) = \infty$ when $g > 0$.

A2. U is determinate when $m_b \geq 0$ and $\gamma \in [0, 1)$; smooth; strictly concave; $U'_1 > 0$ and $U'_2 < 0$.

A2a. $U'_2(m_b, \gamma)/U'_1(m_b, \gamma) \to \infty$ when $\gamma \to 1$.

A2b. $U'_1(m_b, \gamma)$ decreases with γ.

A3. $F_i(m_i, g) = f_i(m_i)g^\alpha, \alpha \geq 0$.

We will introduce the index of elasticity of marginal costs:

$$E_i = c_i'' y_i / c_i' = f_i'' f_i' /(f_i')^2,$$

where $c_i(\ )$ is a function inverse of $f_i(\ )$.

We will call the tax rate σ optimum if it maximizes aggregate equilibrium output in the absence of corruption.

Basic theorem. *If $E_i \leq 1$ for all i and the tax rate does not exceed the optimum value $\alpha/(1 + \alpha)$, then the transition from C- or CCM-equilibrium to equilibrium free of corruption is beneficial to all firms.*

The proof of the theorem is contained in [17] and is not given here. We will note only one fact of fundamental significance for investigating the model.

Suppose that A1–A3 are fulfilled. We will consider the first-order condition for the bureaucrat's problem (4) and (5) in a state of equilibrium:

$$U'_1(m_b, \gamma)m_b + U'_2(m_b, \gamma)\gamma = 0, \quad (12)$$

where U'_1 and U'_2 are partial derivatives of the function U with respect to the first and second argument, respectively. Suppose that $\Gamma(m_b)$ is the solution of (12) with arbitrary fixed m_b. Then the C-equilibrium distribution of m_i is the solution of the problem

$$\max(1-\sigma)\ln(\sum f_i(m_i)) + \sigma\int_1^{M-m}(\Gamma(x)/x)dx$$

$m = \sum m_i, 0 \le m_i \le M_i,$

where $M = \sum M_i$.

In [17], examples are also given showing that the conditions of the basic theorem are close to necessary.

Notes

1. See the Appendix for a precise formulation of the model and the basic result. A more detailed presentation, including proofs, is found in [17]. We will note that the proposed model is a generalization of the construction suggested in [10].

2. The model is a modification of the construction that was considered in a different context in [18]. We will limit ourselves to a static approach. Dynamic models of corruption with more than one state of equilibrium are found, in particular, in [4, 5].

3. Comparison of the two types of models suggests an analogy with inflation theory, where it is customary to distinguish fundamental factors (such as the budget deficit) and expectations.

4. A good example is payment for an entry visa, which is differentiated in a number of embassies according to how quickly the visa is issued.

References

1. P. Bennet. "Sleazy Does It." *Business Central Europe*, Dec. 1997/January 1998.

2. A. Åslund. "Reformy i prisvoenie renty v rossiiskoi ekonomike" [The Reforms and Rent Appropriation in the Russian Economy]. In *Sotsial'naia politika v period perekhoda k rynku: problemy i resheniia* [Social Policy in the Period of Transition to the Market: Problems and Solutions]. Moscow: Moscow Carnegie Center, 1996.

3. R. Ericson. "On an Allocative Role of the Soviet Second Economy." In *Marxism, Central Planning, and the Soviet Economy*, ed. P. Desai. Cambridge, MA: MIT Press, 1983.

4. F.T. Lui. "A Dynamic Model of Corruption Deterence." *Journal of Public Economics*, vol. 31, no. 2, 1986.

5. J.A. Tirole. *Theory of Collective Reputations with Applications to the Persistence of Corruption and to Firm Quality*. Paris: Institut d'Economie Industrielle, Toulouse, MIT and Cera, 1993.

6. K.M. Murphy, A. Shleifer, and R.W. Vishny. "Why Is Rent-Seeking So Costly to Growth?" *American Economic Review*, vol. 83, 1993.

7. A. Shleifer and R. Vishny. "Corruption." *Quarterly Journal of Economics*, August 1993.

8. A.A. Vasin and O.B. Aganova. "Matematicheskaia model' optimal'noi organizatsii nalogovoi inspektsii" [A Mathematical Model of Optimal Organization of Tax Inspection]. In *Programmno-apparatnye sredstva i matematicheskie obespechenie vychislitel'nykh sistem*. Moscow: Moscow State University, 1994.

9. C. Bicchieri and C. Rovelli. "Evolution and Revolution. The Dynamics of Corruption." *Rationality and Society*, vol. 7, no. 2, 1996.

10. L. Polishchuk and A. Savvateev. "Spontaneous Emergence of Property Rights:

A Critical Analysis." Paper presented at the conference on Transforming Government in Transition Economies, Moscow, September 17, 1997.

11. M. Alekseev, C. Gaddy, and J. Leitzel. "Economic Crime and Russian Reform." *Journal of Institutional and Theoretical Economics*, vol. 151, no. 4, 1995.

12. J. Leitzel. *Corruption and Organized Crime in the Russian Transition*. Durham: Duke University Press, 1996.

13. M. Levin and G. Satarov. "Iavlenie korruptsii v Rossii" [The Phenomenon of Corruption in Russia]. *Nezavisimaia gazeta*, no. 185 (1510), October 2, 1997.

14. A. Gelb, A. Hilman, and H. Ursprung. "Rents and the Transition." *Background Paper*. World Bank Development Report, 1996.

15. R. K. Goel and D. P. Rich. "On the Economic Incentives for Taking Bribes." *Public Choice*, vol. 61, no. 3, 1989.

16. R. Allard. "The Measurability of Budget Related Rent-seeking." *Public Choice*, vol. 85, nos. 3–4, 1995.

17. V. Polterovich. *Corruption and Tax Policy*. Moscow: Central Economics and Mathematics Institute and the New Economic School, 1997.

18. V. Polterovich. *Towards the Theory of Privatization*. Moscow: Central Economics and Mathematics Institute, Russian Academy of Sciences, WP/96/001/, 1996.